EXHIBIT N

U.S. Patent No. 8,621,539 ("the '539 Patent") Exemplary Infringement Chart

The Accused MoCA Instrumentalities are instrumentalities that DISH deploys to provide a whole-premises DVR network over an on-premises coaxial cable network, with DISH "Hopper" and "Joey" nodes operating with data connections compliant with MoCA 1.0, 1.1, and/or 2.0. The Accused MoCA Instrumentalities include the DISH Hopper, DISH Hopper with Sling, DISH Hopper DUO, DISH Joey, DISH Joey 2, and DISH Super Joey, DISH Hopper 3, DISH 4K Joey, and DISH Joey 3, and substantially similar instrumentalities. DISH literally and/or under the doctrine of equivalents infringes the claims of the '539 Patent under 35 U.S.C. § 271(a) by making, using, selling, offering for sale, and/or importing the Accused MoCA Instrumentalities.

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1. A modem for communication to at least one node across at least one channel of a coaxial network, the modem comprising:	The Accused Services are provided using at least the Accused MoCA Instrumentalities including the DISH Hopper, DISH Hopper with Sling, DISH Hopper DUO, DISH Joey, DISH Joey 2, DISH Super Joey, DISH Hopper 3, DISH 4K Joey, and DISH Joey 3, and devices that operate in a similar manner. The Accused MoCA Instrumentalities operate to communicate to at least one node across at least one channel of a coaxial network as described below. The DISH full-premises DVR network constitutes a coaxial network as claimed. The DISH full-premises DVR network is a MoCA network created between at least one Hopper DVR and one or more Joey receivers using the on-premises coaxial cable network. This MoCA network is compliant with MoCA 1.0, 1.1, and/or 2.0. "The MoCA system network model creates a coax network which supports communications between a convergence layer in one MoCA node to the corresponding convergence layer in another MoCA node." (MoCA 1.0, Section 1. *See also* MoCA 1.1, Section 1.1; MoCA 2.0, Section 1.2.2) "The MoCA Network transmits high speed multimedia data over the in-home

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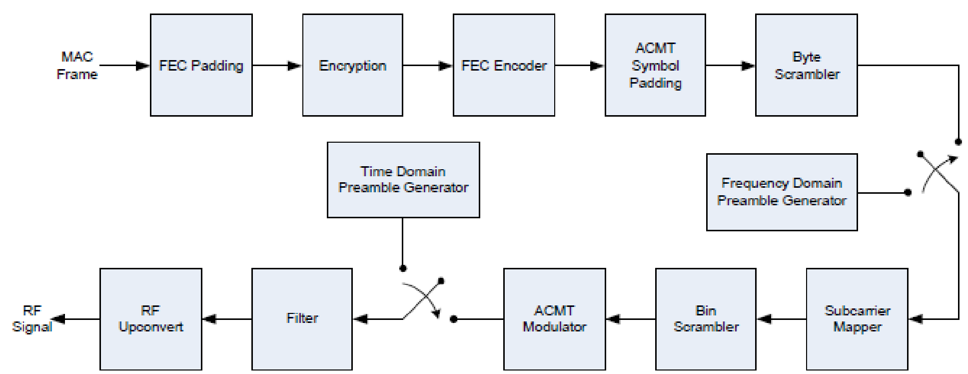
	coaxial cable infrastructure.” (MoCA 1.0, Section 2. *See also* MoCA 1.1, Section 2; MoCA 2.0, Section 5) “PHY data packets carry MAC data and control frames as PHY payload. Figure 4-3 shows an example of how a PHY data packet is constructed from a MAC frame. In this example, the FEC-padded MAC frame is encrypted and encoded into two Reed-Solomon code words, the last code word being shortened to minimize FEC padding. The encoded data is ACMT padded, scrambled and modulated onto the sub-carriers of three ACMT symbols. The ACMT symbols are bin-scrambled and then transformed to the time-domain where a cyclic prefix is added to each ACMT symbol to obtain the PHY data payload. Finally, a preamble is prepended to the PHY data payload and is filtered and upconverted to RF for transmission onto the media. In practice, the number of Reed-Solomon code words and number of ACMT symbols per PHY data packet will vary as a function of the MAC frame size and modulation profile. The processing steps referred to here are specified in Section 4.3.” (MoCA 1.0, Section 4.2.1.2. See also MoCA 1.1, Section 4.2.1.2, MoCA 2.0, Section 14.2)  **Figure 4-2. PHY Data Packet Transmission Processing**

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	(MoCA 1.0, Figure 4-2. *See also* MoCA 1.1, Figure 4-2, MoCA 2.0, Figure 14-2) "The MoCA MAC protocol is built on a fully coordinated TDMA channel. It is a distributed network where one of the nodes is automatically selected to be the Network Coordinator (NC), which is responsible for generating the timing and resource allocation for the entire network." (MoCA 1.0, Section 2.3.1. *See also* MoCA 1.1, Section 2.3.1, MoCA 2.0, Section 7.4) "In the Admission Request message, the NN MUST send a signal level value indicating how much the NC is to reduce transmit power for subsequent probe transmissions. This information MUST be conveyed back to the NC in the INITIAL_PWR_ADJUSTMENT field of the Admission Request frame. The NC MUST use the value of this INITIAL_PWR_ADJUSTMENT to scale down from its maximum transmit power the power of subsequent probes the NC transmits to the NN." (MoCA 1.0, Section 3.10.2.1 *See also* MoCA 1.1, Section 3.10.2.1, MoCA 2.0, Section 7.11.2.1) DISH utilizes the MoCA standard to provide an on-premises DVR network over an on-premises coaxial cable network as described below:

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	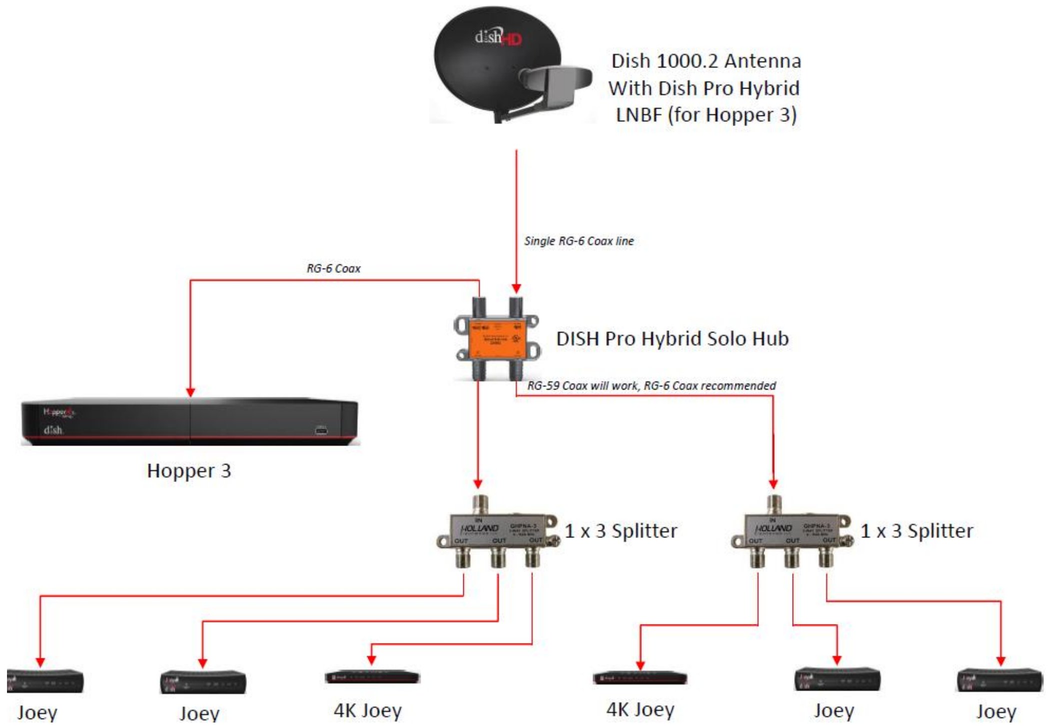 DISH PRO HYBRID SOLO HUB: This Solo Hub is a home video network device that combines multi-orbital coaxial cable satellite feeds from a DISH 1000.2 antenna or switch into a single-cable coaxial satellite feed to support MoCA networking for the Hopper 3 DVRs (host). The client ports are intended to feed up to 6 Joey client receivers (clients). The Solo Hub creates a MoCA video network for Hopper DVRs and Joeys. Rated 50 MHz to 3 GHz. SPLITTERS: 1 GHz common splitters can be used to feed Joey client receivers. HOPPER 3: The Hopper 3 is the revolutionary whole-home DVR from DISH that

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	includes 16 satellite tuners and a 2TB hard drive. JOEY: The Joey is the MoCA thin-client receiver that networks with the Hopper for viewing on additional TVs. 4K JOEY: The 4K Joey is an option for installation on additional 4K TVs. DISH PRO HYBRID 42 SWITCH: This switch allows two Hopper 3 DVRs to be installed using a single DISH traditional 1000.2 antenna. Each Hopper 3 forms its own MoCA video network with connected Joeys. The switch comes with a 110VAC power supply unit. Your new Hopper® 3 receiver is a Whole-Home HD DVR that offers full digital video recording functionality, including pausing live TV, to every TV in your house that is part of your Whole-Home DVR system. The Hopper 3 receiver is the hub for all things entertainment. It is an HD DVR that provides the equivalent of 16 tuners, allowing you to record multiple HD channels at once and at any time and play them back in any room in your home. Using the PrimeTime Anytime® feature, you can record up to six HD channels simultaneously (with your local ABC, CBS, FOX and NBC channels provided in HD, which may not be available in all markets). It is one HD DVR that works independently on as many as four different TVs at the same time, so everyone can be in different room watching their favorite TV programming. Joey® receivers (Joey®, SuperJoey®, Wireless Joey®, 4K Joey™) connect to other TVs in your home and link to the Hopper 3 system, creating a Whole-Home DVR network. It supports all of the features of the Hopper 3 (with the exception of Picture-In-Picture) and offers an identical user interface as the Hopper 3. You can connect a Joey receiver to a high-definition or standard-definition TV.

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<tr><td></td><td>
<h2>CONNECTING THE JOEY RECEIVER(S)</h2>
This section describes how to connect the receiver’s HOME VIDEO NETWORK connection to one or more cable-ready remote TV(s) located in other room(s) away from the Hopper. You can use these instructions to connect TVs in your home to see live and recorded programming from the Hopper. This installation uses your in-home coaxial cable system. If your home does not have built-in cabling, it will be necessary to run these cables from the Hopper HD DVR to each Joey Receiver conected to a remote TV. Due to the potential complexity of this installation, you should have this professionally installed. Call the DISH Customer Service Center at 1-800-333-DISH (3474) for more information.
If you need another remote control, be sure to order the replacement remote control kit for Hopper and Joey that uses UHF-2G signals. Call your DISH retailer, or visit www.mydish.com online, select Upgrades, then Products, and click on Remote & Accessories.
1 Connect the HOME VIDEO NETWORK output on the back of the Hopper HD DVR to an existing wall cable outlet using a coaxial cable.
2 Connect the Joey Receiver(s) in other room(s) to existing wall cable outlet(s) using coaxial cable(s).
3 Connect the Joey Receiver(s) to an audio/video input of the remote TV in each room.
• If it is a high-definition TV or monitor and an HDMI connection is available on the remote TV, use a single HDMI cable from the output on the back of the Joey Receiver to provide high-quality audio and HD/SD video. See page 94.
• If it is a standard-definition TV or an HDMI connection is not available on the remote TV, use composite (yellow) video and stereo audio cables from the outputs on the back of the Joey Receiver. See page 95.
4 Turn on every Joey Receiver and remote TV connected to the in-home cabling system. If you have not already done so, you may need to pair a remote control to each Joey.
5 Follow the on-screen prompts or included instructions for linking each Joey Receiver to your Hopper HD DVR. (The Hopper is the host for DISH Whole-Home DVR services.)
6 Confirm that you see a picture from your Joey Receiver(s) on your remote TV(s).
• If your picture looks good, then you are finished with this procedure.
• If your TVs do not display a picture or if the picture is not as clear as you would like it to be, repeat the steps to confirm all the connections. Coaxial connections should be hand-tightened.
</td></tr>
<tr><td>a transmitter; and</td><td>The Accused MoCA Instrumentalities include a transmitter as described below.</td></tr>
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	For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules constituting a transmitter. "The MoCA system includes convergence layers for core networks such as IEEE 802.3 (Ethernet), video streams (i.e., MPEG-2 transport) and digital satellite streams (i.e. DSS transport). The MoCA system network model creates a coax network which supports communications between a convergence layer in one MoCA node to the corresponding convergence layer in another MoCA node. The protocol stack of a MoCA node is shown in Figure 1-1. The protocol stack consists of the physical layer, the MAC layer and one or more convergence layers (CL)." (MoCA 1.0, Section 1. *See also* MoCA 1.1, Section 1; MoCA 2.0, Section 5.1)

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	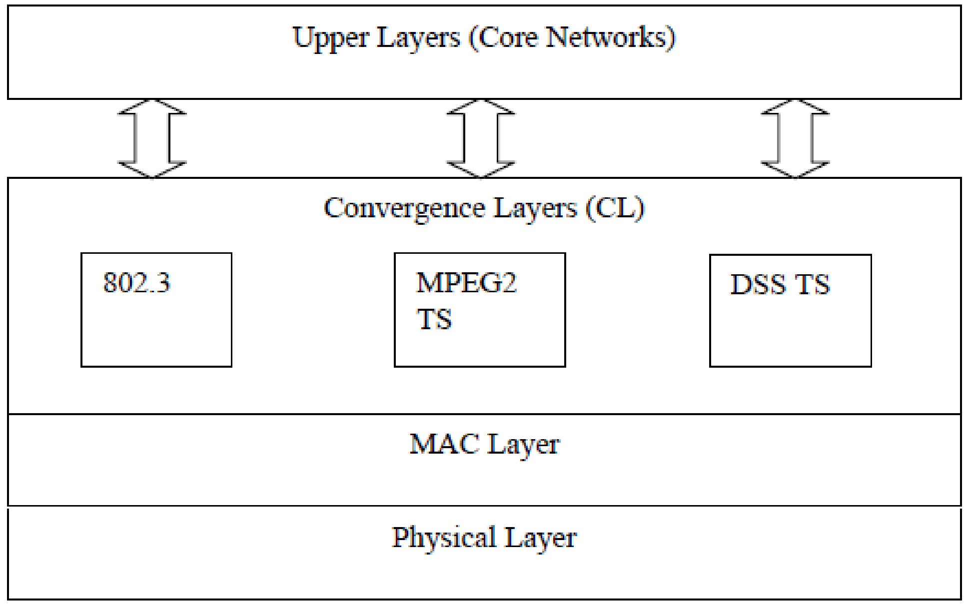 **Figure 1-1. MoCA Node Protocol Stack** (MoCA 1.0, Figure 1-1. *See also* MoCA 1.1, Figure 1-1; MoCA 2.0, Figure 5-1)

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	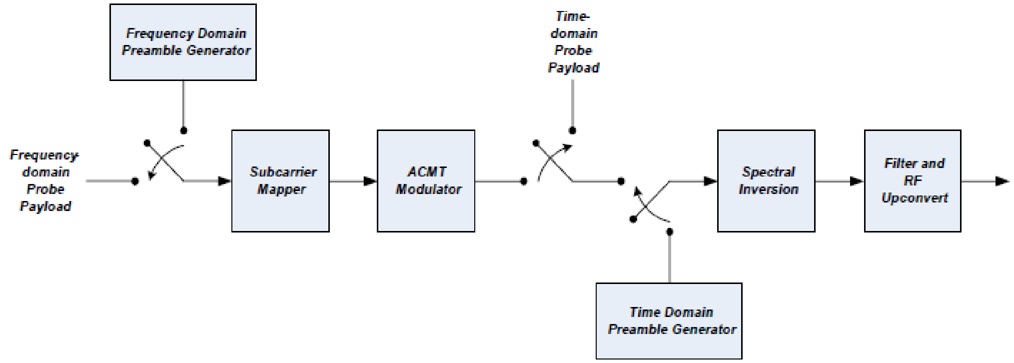 **Figure 4-4. PHY Probe Transmission Processing** (MoCA 1.0, Figure 4-4. *See also* MoCA 1.1, Figure 4-4, MoCA 2.0, Figure 14-4) "PHY probe packets are used to ascertain various transmission medium characteristics. For frequency-domain probes, the probe payload is specified in the frequency domain and ACMT modulated. The steps in construction of a frequency-domain probe are illustrated in Figure 4-5 for a 3 ACMT symbol probe example. In this example, the probe payload is modulated onto the subcarriers of three ACMT symbols. The ACMT symbols are transformed to the time-domain where a cyclic prefixed is added to each ACMT symbol to obtain the PHY probe payload. Finally, a preamble is prepended to the PHY probe payload and is filtered and upconverted to RF for transmission onto the media." (MoCA 1.0, Section 4.2.2.2. *See also* MoCA 1.1, Section 4.2.2.2; MoCA 2.0, Section 14.2.2.1)
a MAC layer in signal communication with the transmitter, the MAC layer using at least one probe packet as an echo profile probe to	The Accused MoCA Instrumentalities include a MAC layer in signal communication with the transmitter, the MAC layer using at least one probe packet as an echo profile probe to measure node delay spread on the network and the MAC layer optimizing

<table>
<tr><th>U.S. Patent No. 8,621,539</th><th>The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the ’539 Patent</th></tr>
<tr><td>measure node delay spread on the network and the MAC layer optimizing the preamble and cyclic prefix requirements or other parameters in response to the measured node delay spread on the network;</td><td>the preamble and cyclic prefix requirements or other parameters in response to the measured node delay spread on the network as described below.

For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules constituting a MAC layer in signal communication with the transmitter, the MAC layer using at least one probe packet as an echo profile probe to measure node delay spread on the network and the MAC layer optimizing the preamble and cyclic prefix requirements or other parameters in response to the measured node delay spread on the network.

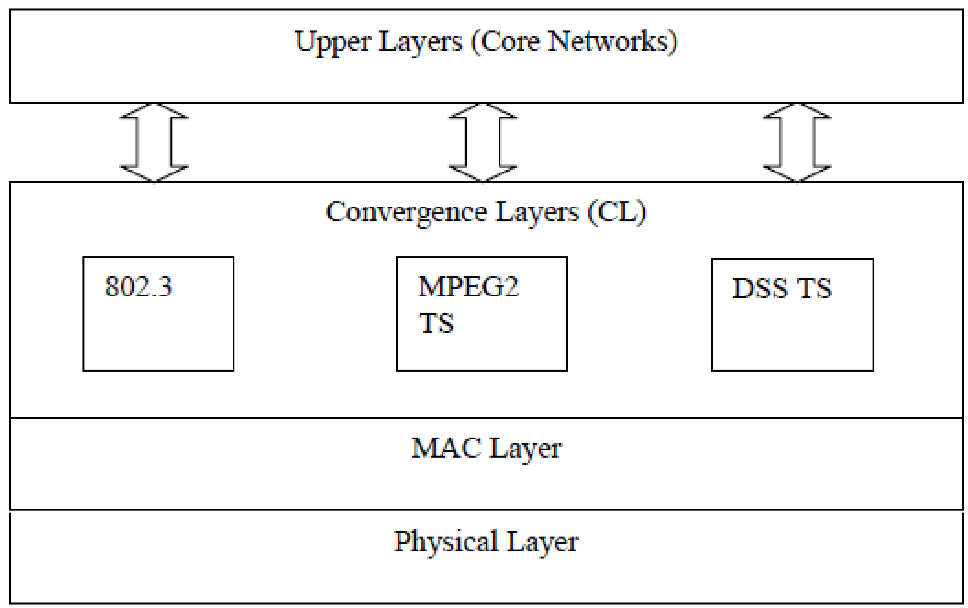

Figure 1-1. MoCA Node Protocol Stack</td></tr>
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	(MoCA 1.0, Figure 1-1. *See also* MoCA 1.1, Figure 1-1; MoCA 2.0, Figure 5-1) “The NC MUST indicate the beginning of the LMO signal exchange for a node by indicating the Link Control State “Type III Probe” (LINK_STATE = 0x07) and by setting LMO_NODE field of asynchronous MAPs to the Node ID of the LMO Node. The LMO_DESTINATION_NODE should always be set to 0x3F. Subsequently, all nodes MUST follow signal exchanges defined in this section.” (MoCA 1.0, Section 3.7. *See also* MoCA 1.1, Section 3.7; MoCA 2.0, Section 8.9) “A variety of physical layer frequency-domain and time-domain probes are used to create modulation profiles, optimize performance, and allow for various calibration mechanisms. Type I Modulation Profile Probes are frequency domain probes used to determine modulation profiles of the channel between any two nodes. Type II Probes are frequency domain probes consisting of two tones that may be used to fine tune performance. A Type III Echo Profile Probe may be used to determine the impulse response of the channel. This information can be used to optimize various physical layer parameters. In addition to the above probes, this specification provides opportunities for various unique Loopback Transmissions which may be useful for RF calibration, among other things.” (MoCA 1.0, Section 2.2. See also MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2) “As shown in Figure 3-11, the first state for the LMO of a node is the Type III Probe State. In this Link Control state, the LMO node transmits Type III Probes to all other nodes and receives reports back from them. This state is followed by the LMO Type I Probe state. In this Link Control state, the LMO node transmits Type I Probes to all other nodes and receives Type I Probe Reports back from them. The next Link Control state is the LMO GCD Distribution state. In this state, the LMO node sends

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	the newly computed GCD PHY Profile to all other nodes and receives acknowledgements back from them. The next Link Control state is the Begin LMO PHY Profile state. The LMO node can begin using its new PHY Profile after the NC indicates this state in asynchronous MAPs.” (MoCA 1.0, Section 3.7.1. See also MoCA 1.1, Section 3.7.1; MoCA 2.0, Section 8.9)

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	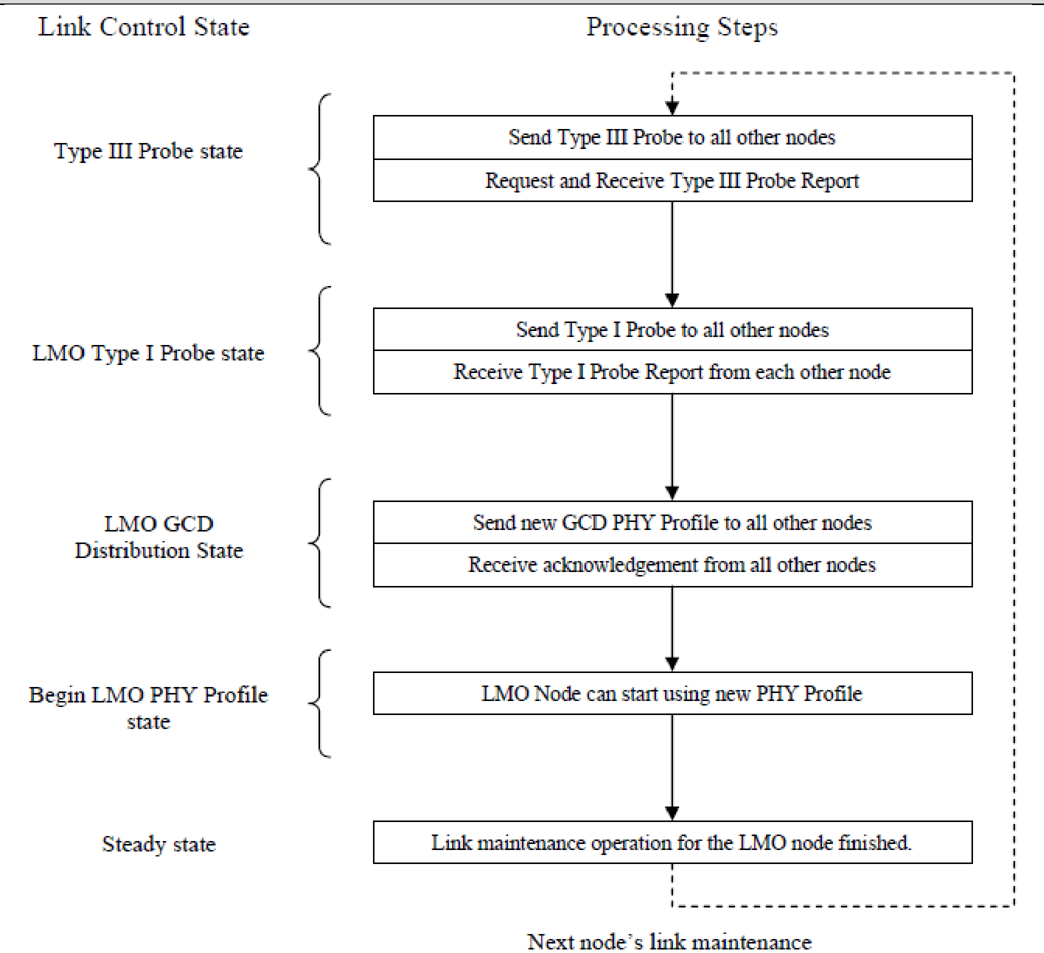 **Figure 3-11. Link Control States during LMO** (MoCA 1.0, Figure 3-11. See also MoCA 1.1, Figure 3-14; MoCA 2.0, Section 8.9)

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	"After the previous signal exchanges, the LMO Node MUST request bandwidth to broadcast N11 Type III Probes to all nodes in the network. For scheduling the transmission of the Type III Probes, the LMO node MUST request transmission time of 2164 SLOT_TIMEs7. This bandwidth MUST be requested by receiving asynchronous MAPs and sending a reservation request. Details of Type III Probe are given in Section 4.5.3. […] The NC and EN's MUST receive these probe transmissions and use them to re-calculate the CP_LENGTH parameter of PHY profile." (MoCA 1.0, Section 3.7.2.2. *See also* MoCA 1.1, Section 3.7.2.2; MoCA 2.0, Section 8.9) "Once an EN sends its Type III probe report, it MUST begin reporting next state (LMO Type I Probe state) in its Reservation Requests. When the LMO node receives probe reports from all other nodes (relayed by the NC), it MUST begin reporting the next Link Control state (LMO Type I Probe state) in its Reservation Requests. Once the NC receives next state indication in the Reservation Requests of all nodes, it changes the Link Control state of the network to "LMO Type I Probe" state. In this Link Control State, the transmit channel from the LMO node to all other nodes in the network (including NC) is characterized and the modulation used on this channel is optimized. The signal exchange diagram of Figure 3-13 shows the messages exchanged during this state." (MoCA 1.0, Section 3.7.3. *See also* MoCA 1.1, Section 3.7.3; MoCA 2.0, Section 8.9)

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	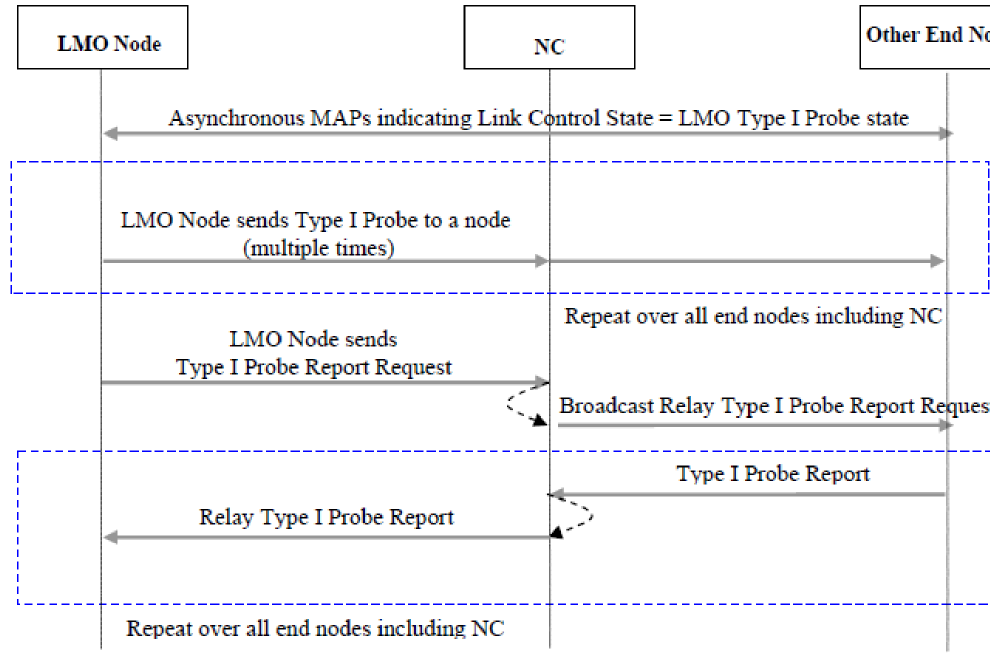 **Figure 3-13. Messages Exchanged During the LMO Type I Probe State** (MoCA 1.0, Figure 3-13. *See also* MoCA 1.1, Figure 3-16, MoCA 2.0, Section 8.9) “When NC receives indication by all other nodes in the network (including LMO node) in their reservation request (NEXT_LINK_STATE = 0x9) that they have finished signal exchanges of the previous state, NC MUST begin advertising LMO GCD Distribution state. This state is indicated by value 0x09 in the Asynchronous MAPs. When the LMO node receives Type I Probe Reports from all other nodes, it must re-calculate its GCD PHY Profiles and send back to all other nodes. Signals exchanged in this state are shown in Figure 3-14.”

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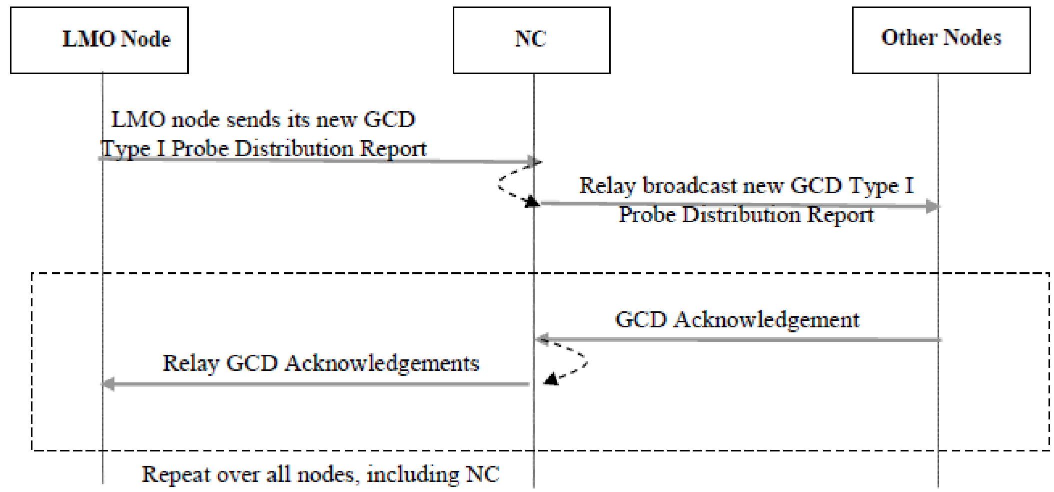
	(MoCA 1.0, Section 3.7.4. *See also* MoCA 1.1, Section 3.7.4; MoCA 2.0, Section 8.9)  **Figure 3-14. Messages Exchanged During GCD Distribution State** (MoCA 1.0, Figure 3-14. *See also* MoCA 1.1, Figure 3-18, MoCA 2.0, Section 8.9) “After the LMO node has received acknowledgments from all nodes, it MUST advance its LINK_STATE field to “Begin LMO PHY Profile” state. When the NC receives the updated LINK_STATE indication from all other nodes in the network, it MUST advance the Link Control state of the network to “Begin LMO PHY Profile” state. When the LMO node receives this Link Control state indication, it can begin using newly computed PHY profiles (including transmit power settings) as described in Section 3.13.3.”

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	(MoCA 1.0, Section 3.7.5. *See also* MoCA 1.1, Section 3.7.5; MoCA 2.0, Section 8.9) “The Type I Probe Report conveys critical information about channel conditions such as Modulation Profile and Power Control. The calculated parameters of this report are derived from Type I and optionally from Type III Probes and are described in Table 3-27. These parameters are to be used in future transmissions to the node that sent the report.” (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7)

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<tr><th>U.S. Patent No. 8,621,539</th><th>The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the ’539 Patent</th></tr>
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Table 3-27. Type I Probe Report Calculated Parameters

Parameter	Explanation
PREAMBLE_TYPE	Preamble Type P3 or P4 (see Section 4.4.2). Selection is based on channel conditions. For MAP elements, this field is Reserved.
BITS_PER_ACMT_SYMBOL	The total number of bits per ACMT symbol, calculated from the Modulation Profile.
CHANNEL_USABLE	Defines if the bandwidth passes the Admission Limit (Section 8.1.5) during Admission or Minimum Link Throughput (Section 8.1.6) during LMO.
CP_LENGTH	Cyclic Prefix length to be used in future unicast transmissions. May also used to calculate the CP length for GCD transmissions.
TPC_BACKOFF_MAJOR	Outer Loop Power Control backoff
TPC_BACKOFF_MINOR	Outer Loop Power Control backoff
SC_MOD	Modulation Profile

(MoCA 1.0, Table 3-27. *See also* MoCA 1.1, Table 3-33, MoCA 2.0, Table 6-32)

“The Cyclic Prefix length identified here SHOULD be the same as that in the Type III Probe Report. The new CP is used for data transmissions after the profile has been switched through the Begin PHY Profile State or Begin LMO PHY Profile State message (Section 3.5).”
(MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7)
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	"The SC_MOD parameter is used to define the Modulation Profiles for both unicast packets and GCD packets." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7) "PHY Profile – A set of parameters that defines the modulation between two nodes, including the preamble type, Cyclic Prefix length, Modulation Profile, and transmit power." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Modulation Profile - A term used to describe various modulation parameters used for an ACMT transmission." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3)
wherein the transmitter communicates the at least one transmit packet.	The transmitter communicates the at least one transmit packet as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules constituting the transmitter communicating the at least one transmit packet.

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	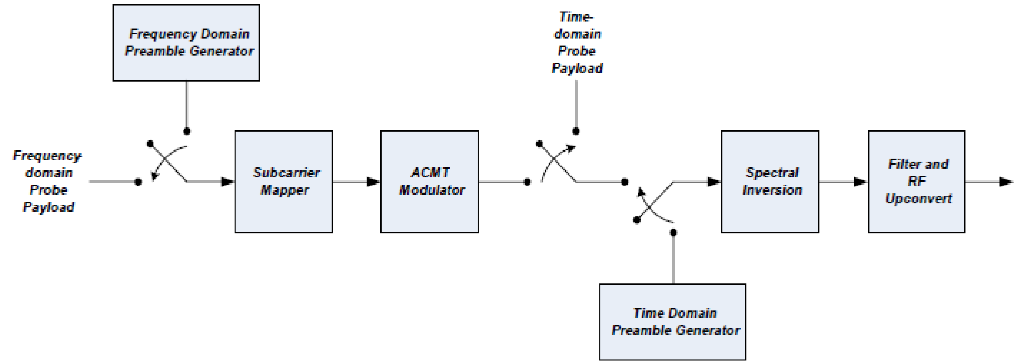 **Figure 4-4. PHY Probe Transmission Processing** (MoCA 1.0, Figure 4-4. *See also* MoCA 1.1, Figure 4-4, MoCA 2.0, Figure 14-4) "PHY probe packets are used to ascertain various transmission medium characteristics. For frequency-domain probes, the probe payload is specified in the frequency domain and ACMT modulated. The steps in construction of a frequency-domain probe are illustrated in Figure 4-5 for a 3 ACMT symbol probe example. In this example, the probe payload is modulated onto the subcarriers of three ACMT symbols. The ACMT symbols are transformed to the time-domain where a cyclic prefixed is added to each ACMT symbol to obtain the PHY probe payload. Finally, a preamble is prepended to the PHY probe payload and is filtered and upconverted to RF for transmission onto the media." (MoCA 1.0, Section 4.2.2.2. *See also* MoCA 1.1, Section 4.2.2.2; MoCA 2.0, Section 14.2.2.1)

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